

PATENT

Application No. 10/821,818
Attorney Docket No. 067441-5013-US
Former Docket No. A-69466-5; 470900-00025*In the Claims:*

1. (Original) A method of designing a desired fold line for a non-crushable sheet of material comprising the steps of:
defining said desired fold line in a parent plane on a drawing system; and
populating said fold line with a fold geometry including a series of cut zones that define a series of connected zones configured and positioned relative to said fold line whereby upon folding said material along said fold line produces edge-to-face engagement of said material on opposite sides of the cut zones.
2. (Currently amended) The method as set forth in claim 1 further comprising ~~[[locating, scaling and/or shaping]]~~ manipulating said cut zones to define said connected zones that are along said fold line so as to enable said edge-to-face engagement upon folding of said material along said fold line, wherein said manipulating is selected from the group of locating, scaling, shaping, and combinations thereof.
3. (Currently amended) The method as set forth in claim 2 further comprising ~~[[relocating, rescaling and/or reshaping]]~~ further manipulating at least one of said cut zones to ~~[[displace, add and/or subtract]]~~ adjust at least one of said connected zones, wherein said further manipulating is selected from the group of relocating, rescaling, reshaping, and combinations thereof, and wherein said adjusting is selected from the group of displacing, adding, subtracting, and combinations thereof.
4. (Currently amended) The method as set forth in claim 3 further comprising:
detecting weaknesses in said parent plane; and
~~[[relocating, rescaling and/or reshaping]]~~ manipulating at least one of said connected zones to ~~[[displace, add and/or subtract]]~~ further adjust at least one of said connected zones based on localized fold geometry adjacent said weaknesses, wherein said manipulating said connected zone is selected from the group of relocating, rescaling, reshaping, and combinations thereof, and

PATENT

Application No. 10/821,818
Attorney Docket No. 067441-5013-US
Former Docket No. A-69466-5; 470900-00025

wherein said further adjusting is selected from displacing, adding, subtracting, and combinations thereof.

5. (Original) The method as set forth in claim 1 wherein said populating step defines said cut zones and connected zones to resist stress concentration, fatigue, or fracture initiation upon folding said material along said fold line.

6. (Original) The method as set forth in claim 1 further comprising defining said fold geometry based upon at least one parameter selected from the group of material, material thickness, strap width, strap density, kerf, fatigue strength, and angle of material orientation.

7. (Original) The method as set forth in claim 1 wherein said method is implemented as an adjunct to one of a CAD/CAM system having fold and unfold capabilities.

8. (Original) The method as set forth in claim 7 further comprising providing a visualization on said CAD/CAM system that displays said cut zones and said connected zones geometry as populated along said fold line.

9. (Original) The method as set forth in claim 1 wherein said method is implemented integral with a CAD/CAM system having fold and unfold capabilities.

10. (Original) The method as set forth in claim 1 further comprising designing a creased sheet-material product including creased features, wherein said cut zones and said connected zones are superimposed upon the creased features.

11. (Currently amended) A method of designing a desired fold line for a non-crushable sheet of material comprising the steps of:

storing a plurality of cut zone configurations and connected zone configurations having differing [[dimensions and/or shapes]] physical characteristics;
defining a desired fold line in a parent plane on a drawing system;

PATENT

Application No. 10/821,818
 Attorney Docket No. 067441-5013-US
 Former Docket No. A-69466-5; 470900-00025

selecting a preferred ~~[[cut zone and/or a preferred connected zone]]~~ zone which ~~[[have]]~~ has a desired shape and scale, wherein said zone comprises a member from the group of a cut zone, a connected zone, and combinations thereof;

locating a preferred fold geometry along said fold line, said preferred fold geometry including said selected ~~[[cut zone and said selected connected]]~~ zone; and

~~[[relocating, resealing and/or reshaping]]~~ manipulating said preferred fold geometry to ~~[[displace, add and/or subtract]]~~ adjust at least one of said connected zones, whereby upon folding said material along said fold line produces edge-to-face engagement of said material on opposite sides of said cut zones, wherein said manipulating is selected from the group of relocating, rescaling, reshaping, and combinations thereof, and wherein said adjusting is selected from the group of displacing, adding, subtracting, and combinations thereof.

12. (Original) The method as set forth in claim 11 further comprising providing a fastening mechanism for permitting connection of a first plane of said material with a second plane lapped with said first plane in association with said fold line.

13. (Original) The method as set forth in claim 12 wherein said fastening mechanism is selected from the group of aligned holes, tabs, slots and combination thereof.

14. (Original) A computer program product in a computer-readable medium for use in a data processing system for designing a desired fold line for a non-crushable sheet of material, the computer program product comprising:

instructions for defining said desired fold line in a parent plane on a drawing system; and
 instructions for populating said fold line with a fold geometry including a series of cut zones that define a series of connected zones configured and positioned relative to said fold line whereby upon folding said material along said fold line produces edge-to-face engagement of said material on opposite sides of the cut zones.

15. (Currently amended) The computer program product as set forth in claim 14 further comprising instructions for ~~[[locating, sealing and/or shaping]]~~ manipulating said cut

PATENT

Application No. 10/821,818
Attorney Docket No. 067441-5013-US
Former Docket No. A-69466-S; 470900-00025

zones to define said connected zones that are along said fold line so as to enable said edge-to-face engagement upon folding of said material along said fold line, wherein said manipulating is selected from the group of locating, scaling, shaping, and combinations thereof.

16. (Currently amended) The computer program product as set forth in claim 15 further comprising instructions for ~~[[relocating, resealing and/or reshaping]]~~ further manipulating at least one of said cut zones to ~~[[displace, add and/or subtract]]~~ adjust at least one of said connected zones, wherein said further manipulating is selected from the group of relocating, rescaling, reshaping, and combinations thereof, and wherein said adjusting is selected from the group of displacing, adding, subtracting, and combinations thereof.

17. (Currently amended) The computer program product as set forth in claim 16 further comprising:
instructions for detecting weaknesses in said parent plane; and
instructions for ~~[[relocating, resealing and/or reshaping]]~~ manipulating at least one of said connected zones to ~~[[displace, add and/or subtract]]~~ further adjust at least one of said connected zones based on localized fold geometry adjacent said weaknesses, wherein said manipulating said connected zone is selected from the group of relocating, rescaling, reshaping, and combinations thereof, and wherein said further adjusting is selected from the group of displacing, adding, subtracting, and combinations thereof.

18. (Original) The computer program product as set forth in claim 14 wherein said instructions for populating define said cut zones and connected zones to resist stress concentration and fracture initiation upon folding said material along said fold line.

19. (Original) The computer program product as set forth in claim 14 further comprising instructions for defining said fold geometry based upon at least one parameter selected from the group of material, material thickness, strap width, strap density, kerf, fatigue strength, and angle of material orientation.

PATENT

Application No. 10/821,818
 Attorney Docket No. 067441-5013-US
 Former Docket N.J. A-69466-5; 470900-00025

20. (Original) The computer program product as set forth in claim 14 wherein said computer program product is configured for installation with a CAD/CAM system having fold and unfold capabilities.

21. (Currently amended) The computer program product as set forth in claim 14 ~~claim 20~~ further comprising instructions for providing a visualization on said CAD/CAM system that displays said cut zones and said connected zones geometry as populated along said fold line.

22. (Original) The computer program product as set forth in claim 14 wherein said computer program product includes a CAD/CAM application having fold and unfold capabilities.

23. (Original) The computer program product as set forth in claim 14 further comprising instructions for designing a creased sheet-material product including creased features, wherein said cut zones and said connected zones are superimposed upon desired creased features.

24. (Currently amended) A computer program product in a computer-readable medium for use in a data processing system for designing a desired fold line for a non-crushable sheet of material, said computer program product comprising:

instructions for storing a plurality of cut zone configurations and connected zone configurations having differing ~~[[dimensions and/or shapes]]~~ physical characteristics;
 instructions for defining a desired fold line in a parent plane on a drawing system;
 instructions for selecting a preferred ~~[[cut zone and/or a preferred connected]]~~ zone which ~~[[have]]~~ has a desired shape and scale, wherein said preferred zone comprises a member selected from the group of a cut zone, a connected zone, or combinations thereof;

instructions for locating a preferred fold geometry along said fold line, said preferred fold geometry including said selected ~~[[cut zone and said selected connected]]~~ zone; and

instructions for ~~[[relocating, rescaling and/or reshaping]]~~ manipulating said preferred fold geometry to ~~[[displace, add and/or subtract]]~~ adjust at least one of said connected zones, whereby

PATENT

Application No. 10/821,818
Attorney Docket No. 067441-5013-US
Former Docket No. A-69466-5; 470900-00025

upon folding said material along said fold line produces edge-to-face engagement of said material on opposite sides of said cut zones, wherein said manipulating is selected from the group of relocating, rescaling, reshaping, and combinations thereof, and wherein said adjusting is selected from the group of displacing, adding, subtracting, and combinations thereof.

25. (Original) The computer program product as set forth in claim 24 further comprising instructions for providing a fastening mechanism for permitting connection of a first plane of said material with a second plane lapped with said first plane in association with said fold line.

26. (Original) The computer program product as set forth in claim 25 wherein said fastening mechanism is selected from the group of aligned holes, tabs, slots and combination thereof.

27. (Original) A data processing system for designing a desired fold line for a non-crushable sheet of material comprising:
input means for defining said desired fold line in a parent plane on a drawing system; and
computing means for populating said fold line with a fold geometry including a series of cut zones that define a series of connected zones configured and positioned relative to said fold line whereby upon folding said material along said fold line produces edge-to-face engagement of said material on opposite sides of the cut zones.

28. (Currently amended) The system as set forth in claim 27 wherein said computing means ~~[[locates, scales and/or shapes]]~~ manipulates said cut zones to define said connected zones that are along said fold line so as to enable said edge-to-face engagement upon folding of said material along said fold line, wherein said manipulating is selected from the group of locating, scaling, shaping, and combinations thereof.

29. (Currently amended) The system as set forth in claim 28 wherein said computing means ~~[[relocates, rescales and/or reshapes]]~~ further manipulates at least one of said cut zones to

PATENT

Application No. 10/821,818
Attorney Docket No. 067441-5013-US
Former Docket No. A-69466-5; 470900-00025

~~[[displace, add and/or subtract]]~~ adjust at least one of said connected zones, wherein said further manipulating is selected from the group of relocating, rescaling, reshaping, and combinations thereof, and wherein said adjusting is selected from the group of displacing, adding, subtracting, and combinations thereof.

30. (Currently amended) The system as set forth in claim 29 wherein said computing means detects weaknesses in said parent plane and ~~[[relocates, rescales and/or reshapes]]~~ manipulates at least one of said connected zones to ~~[[displace, add and/or subtract]]~~ further adjust at least one of said connected zones based on localized fold geometry adjacent said weaknesses, wherein said manipulating said connected zone is selected from the group of relocating, rescaling, reshaping, and combinations thereof, and wherein said further adjusting is selected from the group of displacing, adding, subtracting, and combinations thereof.

31. (Original) The system as set forth in claim 27 wherein said computing means defines said cut zones and connected zones to resist stress concentration and fracture initiation upon folding said material along said fold line.

32. (Original) The system as set forth in claim 27 wherein said computing means defines said fold geometry based upon at least one parameter selected from the group of material, material thickness, strap width, strap density, kerf, fatigue strength, and angle of material orientation.

33. (Original) The system as set forth in claim 27 further comprises memory means storing a plurality of predetermined fold geometries based upon at least one parameter selected from the group of material, material thickness, strap width, strap density, kerf, fatigue strength, and angle of material orientation, wherein said computing means selects one of said predetermined fold geometries.

34. (Original) The system as set forth in claim 27 wherein said system further comprises a CAD/CAM system having fold and unfold capabilities.

PATENT

Application No. 10/821,818
Attorney Docket No. 067441-5013-US
Former Docket No. A-69466-5: 470900-00025

35. (Original) The system as set forth in claim 34 further comprising display means for providing a visualization on said CAD/CAM system that displays said cut zones and said connected zones geometry as populated along said fold line.

36. (Original) The system as set forth in claim 27 wherein said system is used in combination with a CAD/CAM system having fold and unfold capabilities

37. (Original) The system as set forth in claim 27 wherein said system is configured for designing a creased sheet-material product including creased features, wherein said computing means superimposes said cut zones and said connected zones upon the creased features.

38. (Currently amended) A system for designing a desired fold line for a non-crushable sheet of material comprising:
storage means for storing a plurality of cut zone configurations and connected zone configurations having differing ~~[[dimensions and/or shapes]]~~ physical characteristics;
input means for defining a desired fold line in a parent plane on a drawing system;
computing means for selecting a preferred ~~[[cut zone and/or a preferred connected]]~~ zone which ~~[[have]]~~ has a desired shape and scale, wherein said zone comprises a member selected from the group of a cut zone, a connected zone, and combinations thereof, wherein said computing means locates a preferred fold geometry along said fold line, said preferred fold geometry including said selected ~~[[cut zone and said selected connected]]~~ zone, and wherein said computing means ~~[[relocates, rescales and/or reshapes]]~~ manipulates said preferred fold geometry to ~~[[displace, add and/or subtract]]~~ adjust at least one of said connected zones, whereby upon folding said material along said fold line produces edge-to-face engagement of said material on opposite sides of said cut zones, wherein said manipulating is selected from the group of relocating, rescaling, reshaping, and combinations thereof, and wherein said adjusting is selected from the group of displacing, adding, subtracting, and combinations thereof.

PATENT

Application No. 10/821,818
Attorney Docket No. 067441-5013-US
Former Docket No. A-69466-5; 470900-00025

39. (Currently amended) The system as set forth in claim 38 wherein said computing means is configured to design ~~[[and/or form]]~~ a fastening mechanism for permitting connection of a first plane of said material with a second plane lapped with said first plane in association with said fold line.

40. (Original) The system as set forth in claim 39 wherein said fastening mechanism is selected from the group of aligned holes, tabs, slots and combination thereof.